

Remarks

New claim 24 has been added. Support for new claim 24 can be found, for example, at page 10 lines 23-24. Claims 1-24 are pending in the application for reconsideration.

The Examiner has rejected claims 1-23 under 35 USC 103(a) as being unpatentable over U.S. Patent No. 6,362,414 to Fujisawa et al. in view of Published Patent Application No. 20030039843A1 to Johnson et al.

More specifically, the Examiner takes the position that the Fujisawa et al. reference discloses deposition of an aluminum oxide coating by, for example, CVD of an aluminum precursor, and an oxidizing component such as oxygen, water vapor, dry air or the like. The Examiner acknowledges that the Fujisawa et al. reference does not disclose reacting an aluminum halide with an organic ester to form an aluminum oxide film.

The Examiner indicates, however, that the Johnson et al. reference discloses forming an oxide coating with enhanced photocatalytic properties by the reaction of, for example, a titanium precursor with an ester, including an alkylester having an alkyl group with a beta-hydrogen. The Examiner asserts that it would be obvious to combine the teachings of the Fujisawa et al. and Johnson et al. references to achieve the present invention.

Applicants respectfully submit that the claimed invention is not obvious in view of the Fujisawa et al. and the Johnson et al. references. The invention, as defined in claim 1, is a chemical vapor deposition process for depositing an aluminum oxide coating on a hot glass substrate comprising preparing a precursor gas mixture comprising an inorganic aluminum halide and an organic ester having a  $\beta$  hydrogen on the alkyl group bonded to the carboxylate oxygen, maintaining said precursor gas mixture at a temperature below the temperature at which the inorganic aluminum halide reacts with the ester to form an aluminum oxide coating while delivering the gaseous mixture to a coating chamber which opens onto the hot glass substrate, and introducing the precursor gas mixture into the coating chamber, whereby the gaseous mixture is heated to above the reaction temperature of the aluminum halide and the ester and

incorporates oxygen from the ester to cause the deposition of the aluminum oxide coating.

The Fujisawa et al. reference describes a film stack on a glass sheet where an undercoating film may be formed of aluminum oxide. It is taught that such an aluminum oxide film can be formed by a CVD method. The aluminum materials used include trimethylaluminum, aluminum triisopropoxide, diethylaluminum chloride, aluminum acetylacetone, aluminum chloride, or the like. Moreover, Fujisawa et al. teach that oxygen, water vapor, dry air, or the like can be used as an oxidation material. Thus, as conceded by the Examiner, the Fujisawa et al. reference fails suggest using an organic ester as defined in the claims.

The Johnson et al. reference is directed to photocatalytic coatings, and is cited in the Office Action for its suggestion in paragraph 41 that, "As an alternative to including oxygen in the atmosphere of the tin bath to form oxide coatings, the precursor composition can itself include one or more sources of organic oxygen. The organic oxygen can be, for example, an ester or carboxylate ester, such as an alkyl ester having an alkyl group with a  $\beta$ -hydrogen."

According to the MPEP, "[t]o establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations." See MPEP 2143. Further, the teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, not in applicant's disclosure. *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991).

There is nothing in either reference to teach or suggest the combination as proposed by the Examiner. The Fujisawa reference suggests five possible aluminum precursor materials, four of which are organic and only one of which is an inorganic aluminum halide. Fujisawa et al. is devoid of any hint that an inorganic aluminum halide is preferred and, in fact, one would assume from the materials listed that organic

aluminum materials are preferred. For its part, the Johnson et al. reference suggests only that certain organic esters can be used "as an alternative to including oxygen in the atmosphere of the tin bath."

Further, the references fail to provide any indication that a main group metal, such as aluminum, would react sufficiently with an organic alkyl ester to form an aluminum oxide film. Applicants have tried to form metal oxide films with other main group metals and an alkyl ester, such as ethyl acetate, without success. For example, applicants have found that halides of silicon, antimony and tin combined with, for example, ethyl acetate, do not produce viable oxide films on hot glass substrates. This is in contrast to the transition metals, such as the titanium oxide, to which the Johnson et al. reference is primarily directed.

Neither Fujisawa et al. nor Johnson et al. provide any information that would motivate one skilled in the art to attempt to deposit an aluminum oxide film on a hot glass substrate by a CVD process using a combination including an inorganic aluminum halide and an alkyl ester having an alkyl group with a  $\beta$  -hydrogen. Without any such information in the references, the applicants' own specification has been improperly used to supply such motivation.

"A rejection cannot be predicated on the mere identification in [the reference] of individual components of claimed limitations. Rather, particular findings must be made as to the reason the skilled artisan, with no knowledge of the claimed invention, would have selected these components for combination in the manner claimed." *In re Kotzab*, 55 USPQ2d 1313, 1317 (Fed. Cir. 2000).

A prior art suggestion for virtually endless experimentation is not a case of *prima facie* obviousness. *In re Dow Chemical Co.*, 5 USPQ 2d 1529,1532 (Fed. Cir. 1989). In view of the cited references, it is at best obvious to try to the specific deposition process discovered and claimed by the applicants from the many possible combinations outlined therein. This is not the standard of 35 USC §103. *In re Geiger*, 2 USPQ 2d 1276, 1278 (Fed. Cir. 1987).

As there has been no showing of any motivation to modify the references to obtain each and every limitation of claim 1, this claim is not rendered obvious by

Fujisawa et al. and Johnson et al. Claims 2-13 all depend from claim 1 and are patentable at least on this basis. Further, claims 14 -23 are each patentable over the cited references for the reasons discussed above with regard to claim 1. Therefore, withdrawal of the rejection of claims 1-23 as unpatentable under 35 USC § 103 is respectfully requested.

New claim 24 further defines the process of claim 1 wherein the precursor gas mixture is further comprised of molecular oxygen. As noted at page 10 lines 23-24 of the specification, applicants have discovered that, "Addition of molecular oxygen, in some instances, appears to greatly enhance film growth rate and film thickness." The use of precursor gas mixture comprised of an inorganic aluminum halide, an organic ester having a  $\beta$  hydrogen on the alkyl group bonded to the carboxylate oxygen, and molecular oxygen is not suggested in the cited art. In fact, when referring to the use of an organic ester, the Johnson et al. reference directs that it can be used "as an **alternative** to including oxygen." See paragraph 41 (emphasis added). Therefore, claim 24 is patentable over the cited references for this additional reason.

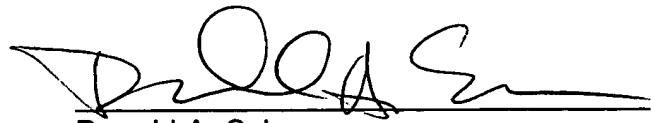
The Office Action also included a provisional rejection on the ground of nonstatutory obviousness-type double patenting over claims 1-16 of copending application No. 10/797450. Applicants submit that the cited pending application is directed to the deposition of gallium oxide films, that the defined gallium precursors react differently with the defined organic esters than do the inorganic aluminum precursors, and that invention claimed herein is not obvious in view the invention claimed in the copending application. Withdrawal of the provisional rejection on the ground of nonstatutory obviousness-type double patenting is therefore requested.

For all the reasons stated herein, Applicants respectfully submit that claims 1-24 are distinguishable from and patentable over the combination of the cited references. Accordingly, favorable reconsideration of claims 1-24 is hereby requested.

Applicants respectfully submit that the present application is in condition for allowance, and a timely action to that end is courteously solicited. If, however, the Examiner would prefer language different from that currently included in the application,

a telephone call to Applicants' attorney to discuss appropriate amendments is respectfully requested.

Respectfully submitted,



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